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EXAMINER	
STIMPERT, PHILIP EARL	

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3746	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,298	RUTZ ET AL.	
	Examiner	Art Unit	
	Philip Stimpert	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7,12,13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7,12,13 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 24 February 2010 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7, 12, 13, and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Regarding claim 13, the examiner does not find support for the limitation in claim 13 of "calculating a currently required rotating speed for the motor base on... only if the current position of the rotating cam corresponds to the compression stroke..." The examiner finds instead that the cited paragraphs indicate that the required speed is

calculated regardless of cam position, and also that specific desired speeds are discussed for the aspiration section of the pump cycle in other sections of the specification (for instance, paragraph 44 of the PGPub of the instant application). The setting of these speeds constitutes control by the examiner's understanding based on the position (within the aspiration stroke) and the dosing requirement (which had to have been previously sufficiently high as to require a complete compression stroke. The phrase, “only if” effectively sets forth a negative limitation which the examiner does not find in the specification, and which the examiner finds contradicted by the setting of a maximum speed during the aspiration stroke. It is therefore unclear how the language recited in claim 13 may be considered supported.

5. Regarding claim 18, the examiner does not find support for an increase in the *linear speed of the ram*. The examiner notes that there is support for an increase in the rotational speed of the motor and cam at the end of the compression stroke, but this is a separate and distinct quantity from the linear speed of the ram. The examiner notes that as drafted, this contradicts the “substantially constant linear speed of the ram” recited in parent claim 15.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 7, 12, 13, and 15-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Regarding claim 13, the claim recites “providing input of a required quantity… the required quantity being that to be delivered during the compression stroke of the metering cycle…” Given that the claim recites a diaphragm driven by a cam as the motive element, and that cams are generally understood to be of constant profile, the plain meaning of the "required quantity" as recited by claim 13 is the volume of fluid displaced by a compression stroke of the pump, which is a fixed quantity resulting from the relative dimensions and placement of the diaphragm, ram, and cam. It is therefore unclear how this can constitute a meaningful input to the calculation step. The examiner notes that the claim does not specify any kind of rate or quantity/per time limitation.

9. Regarding claim 15, the claim positively recites “a compression stroke" in lines 3 and 6.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 7, 12, and 13, as best understood by the examiner, are rejected under 35 U.S.C. 103(a) as being unpatentable over Haberlander et al. (US 6,457,944) in view of Moddemann (US 2002/0067148).

12. Regarding claim 13, Haberlander et al. teach a method for controlling a pump (1, see col. 5, ln. 65-67) including a pump element which may be a diaphragm (col. 2 ln.

27) that is actuated by a ram (2, see col. 5, ln. 50-55) which is powered by an electric motor (3), comprising reciprocating the pumping element by rotation of the cam. Haberlander teaches that the reciprocation takes place in a first direction for a compression, or pressure, stroke and in a second direction for an aspiration, or suction, stroke. Haberlander et al. also teach providing input of a required quantity, in the form of a pump stroke and a total dosing volume, to a positional controller (8, col. 6, ln. 63 through col. 7 ln. 2, and col. 7, ln. 39-41) that is coupled to a motor controller (4). Haberlander et al. further teach providing input of a current position of the rotating cam (from sensors 11) to the controller (8), calculating a currently required rotating speed based on the position and required quantity (col. 7, ln. 17-41), and transmitting that required speed to the motor controller (4). Haberlander et al. do not specifically teach that the motor is an electronically commutated (EC) motor. However, they do teach that at least frequency and thus rotational rate control is necessary for their method, and realized by their pump. Moddemann teaches an EC motor (2), and teaches that it has position and speed control capabilities (paragraph 15). It is thus apparent to those of ordinary skill in the art that the EC motor of Moddemann could be substituted for the asynchronous motor of Haberlander et al. by known methods of motor installation and control circuit linkage, to achieve the predictable result of an operational metering pump as in the system of Haberlander. Where a claimed improvement on a device or apparatus is no more than "the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for improvement," the claim is unpatentable under 35 U.S.C. 103(a). Ex Parte Smith, 83

USPQ.2d 1509, 1518-19 (BPAI, 2007) (citing KSR v. Teleflex, 127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1396 (2007)). Accordingly Applicant claims a combination that only unites old elements with no change in the respective functions of those old elements, and the combination of those elements yields predictable results; absent evidence that the modifications necessary to effect the combination of elements is uniquely challenging or difficult for one of ordinary skill in the art, the claim is unpatentable as obvious under 35 U.S.C. 103(a). Ex Parte Smith, 83 USPQ.2d at 1518-19 (BPAI, 2007) (citing KSR, 127 S.Ct. at 1740, 82 USPQ2d at 1396. Accordingly, since the applicant[s] have submitted no persuasive evidence that the combination of the above elements is uniquely challenging or difficult for one of ordinary skill in the art, the claim is unpatentable as obvious under 35 U.S.C. 103(a) because it is no more than the predictable use of prior art elements according to their established functions resulting in the simple substitution of one known element for another. Thus provided, the EC motor of Moddemann would produce rotation of the rotor via a rotating magnetic field as claimed, under the control of the motor controller (9, 10).

13. Regarding claims 7 and 12, Moddemann teaches capturing the position of the motor via an integral rotor position sensor (11). Those of ordinary skill would appreciate that such a position would be directly analogous to the position of the cam of Haberlander et al., since the cam would be directly coupled to the rotor. Further, as Haberlander et al. teach providing position data to the positional controller (8), this implies at least an operational coupling of the positional controller and any position sensor.

14. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haberlander in view of Moddemann, Llewellyn (GB 2,130,305) and Takahashi et al. (US 5,664,937).

15. Regarding claim 15, Haberlander et al. teach a method for controlling a pump (1, see col. 5, ln. 65-67) including a pump element which may be a diaphragm (col. 2 ln. 27) that is actuated by a ram (2, see col. 5, ln. 50-55) which is powered by an electric motor (3), comprising reciprocating the pumping element by rotation of the cam. Haberlander teaches that the reciprocation takes place in a first direction for a compression, or pressure, stroke and section for an aspiration, or suction, stroke. Haberlander et al. teach that the electric motor (3) is asynchronous, and that the operating speed thereof may be varied (such as during the suction cycle). Haberlander et al. do not teach varying the rotating speed of the cam during a compression stroke of the pump. Llewellyn teaches a cam-driven piston pump, and in particular teaches that the cam is driven to drive the pistons at constant speed (page 1, ln. 119) so as to produce a uniform flow rate (page 1, ln. 29-34). Llewellyn teaches accomplishing this by varying a profile of the cam while maintaining rotational speed thereof. However, those of ordinary skill in the art are aware of the mathematical disciplines of kinematics and calculus, and would thus be completely capable of deriving formulae for producing constant piston linear velocities given any cam profile. Further, Takahashi et al. teach a precision pump which includes altering the rotating speed of a motor to affect pump output pressure evenness (col. 2, ln. 26-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the pump control

system of Haberlander et al. to vary the speed of rotation of the cam as taught by Takahashi et al. to produce constant velocity of the pumping element, as taught by Llewellyn. Thus modified, one of ordinary skill would appreciate that the rotational speed of the cam would decrease to a minimum halfway through the compression stroke, as the component of the cam's movement in the direction of the stroke would be maximum at that point in the stroke and the rotation speed would decrease to it's minimum to maintain the constant linear motion of the diaphragm. Further, Haberlander teaches that it is “possible to significantly shorten the suction cycle relative to the pressure cycle” and that this results in a reduced gap in dosing. Thus it would be obvious to accelerate the rotating speed of the cam from a minimum to a maximum speed starting approximately halfway through the compression stroke so as to maintain the constant linear speed of the diaphragm, and to maintain the maximum rotating speed through the aspiration stroke to minimize the time duration of that stroke. Further, Haberlander et al. do not specifically teach that the motor is an electronically commutated (EC) motor. However, they do teach that at least frequency and thus rotational rate control is necessary for their method, and realized by their pump. Moddemann teaches an EC motor (2), and teaches that it has position and speed control capabilities (paragraph 15). It is thus apparent to those of ordinary skill in the art that the EC motor of Moddemann could be substituted for the asynchronous motor of Haberlander et al. by known methods of motor installation and control circuit linkage, to achieve the predictable result of an operational metering pump as in the system of Haberlander, as above with respect to claim 13.

16. Regarding claim 16, Haberlander et al. teach that the rotational speed of the motor is varied based on a sensed rotor position or a sensed cam position (col. 6, ln. 25-34). One of ordinary skill would appreciate that sensing the one is equivalent to sensing the other, given that they are utilized to determine fore and back dead center positions, and that thus both are sensed and utilized in the control algorithm.

17. Regarding claim 17, according to the combination, the cam is kept at a maximum rotating speed during the aspiration stroke and would thus tend to begin the compression stroke (which the examiner notes begins at the end of the aspiration stroke) at that maximum speed. Further, the component of the cam's movement in the direction of the diaphragm stroke would be minimum at the beginning and end of the compression stroke, thus in order to maintain a constant linear motion, the rotational speed would necessarily be maximum at the start of the compression stroke. As geometrically required to maintain constant linear ram speed during compression, the rotation of the motor would necessarily slow around halfway through the compression stroke and re-accelerate toward the end. This is a function of the component in the direction of reciprocation of the point of contact between the cam and the ram.

18. Regarding claim 18, as best understood by the examiner, the combination of references teaches increasing the speed of rotation of the cam toward the end in order to compensate for the decreasing reciprocating component of the cam's motion at that point in the cycle, in order to maintain as much as possible the constant ram speed.

19. Regarding claim 19, Haberlander teaches operating the motor at a substantially constant (maximum) speed during the aspiration stroke (col. 7, ln. 45-48). With a constant profile cam, this will lead to a variation in the linear speed of the ram.

20. Regarding claim 20, Haberlander teaches that by maximizing the speed during the aspiration stroke, the aspiration stroke is made much shorter than the compression stroke (col. 8, ln 49-54). Since the ram travels the same distance in both strokes, its average speed will be lower during the compression stroke than the aspiration stroke.

Response to Arguments

21. Applicant's arguments filed 24 February 2010 have been fully considered but they are not persuasive.

22. With respect to the new matter rejection of claim 13, the examiner does not find support for the negative limitation as claimed in the cited paragraphs of the specification. Instead, the examiner finds that the speed is calculated throughout the metering cycle of the pump. In particular, in the aspiration stroke (which is based on the rotor position), the calculated speed is the maximum of the motor. Since the pump will not reach the aspiration stroke except after a compression stroke, the calculation resulting in maximum speed is based on the previous reading of the desired quantity requiring a cycle of the pump.

23. With respect to the indefiniteness rejection of claim 13, the examiner maintains the position that the plain meaning of “the required quantity being that to be delivered *during the compression stroke* of the metering cycle” (emphasis added) indicates the displacement of the pump, which is a fixed quantity. If the limitation of a “required

quantity" is intended to signify "a required rate of delivery" or the like, then it should be clearly recited as such. As currently drafted, the claim misleads those of ordinary skill in the art as to the intended scope of the claim.

24. With respect to obviousness of claim 13, the examiner again points out that the claim does not require varying the motor speed within a single stroke, even if the speed calculation is only being performed during the aspiration stroke. The language of the claim reads equally on calculating a number of strokes per a unit of time required to deliver a specific dosing rate, which does not require adjustment within a single stroke. The examiner notes that these limitations are recited in new claim 15, and are addressed above with respect thereto.

25. With respect to the argument that one of ordinary skill would not replace the asynchronous motor of Haberlander et al. with an EC motor as taught by Moddemann, the examiner disagrees. Both motors are electric motors capable of position and speed control, and are thus capable of controllably operating as a prime mover for a pump. Therefore, as discussed at length above, the substitution of an EC motor as taught by Moddemann into the system of Haberlander et al. is regarded as the mere substitution of one known type of motor for another.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

/P. S./
Examiner, Art Unit 3746
31 March 2010